Single Anesthetic Diagnosis and Resection of Malignant Lung Nodules is a Viable Alternative to Conventional Staged Multiple Procedures

Objective:
Increasing wait time from diagnosis to surgical treatment of early stage non-small cell lung cancer (NSCLC) negatively impacts survival. Robotic navigational bronchoscopy, an emerging technology, provides a platform with high diagnostic yield. Leveraged with immediate robotic pulmonary resection, it allows diagnosis and definitive treatment under a single anesthetic. We report our initial results comparing outcomes and costs of single anesthetic bronchoscopy and robotic resection (SABRR) to traditional staged therapies.

Methods:
Since 2021, suitable patients with suspicious lung nodules were offered the option of a single stage robotic navigational biopsy with staging, followed immediately by anatomic resection. These were compared to patients from 2015-2022 undergoing the conventional sequence of CT guided biopsy, followed by staging and then resection by VATS (CTBx-VATS). Inclusion criteria were clinical Stage I-IIa NSCLC who underwent an anatomic resection (segmentectomy or lobectomy). Patients were excluded if they received neoadjuvant therapy, had an initial outside biopsy or a noncancer diagnosis. Complications were defined using the STS Database quality metrics. All direct costs for each episode of care were extracted from the hospital accounting system including labor, operating room supplies, time, equipment depreciation and perioperative care through discharge. Internal annual cost adjustment updates were applied to standardize to 2022 dollars. Data underwent statistical analysis by Student’s t test or Chi squared as appropriate.

Results:
Sixty eligible patients were identified (30 SABRR, 30 CTBx-VATS). There was no difference in clinical characteristics (Table 1). SABRR patients had same day diagnosis and treatment. CTBx-VATS patients waited an average of 32.2\(\pm\)15.7 days between initial biopsy and definitive resection. Mean procedure time in minutes was longer in the SABRR group (257\(\pm\)77) than CTBx-VATS (119\(\pm\)41) (p <0.001). The mean length of stay was 3.6\(\pm\)1.4 days in the SABRR group and 4.2\(\pm\)3.0 days in the CTBx-VATS group (p = 0.298). There were no major complications with either group. Minor post-surgical complications occurred in 5 (16.7\%) patients with SABRR and 8 (26.7\%) patients with CTBx-VATS. (p = 0.166). Additionally, 5 (16.7\%) CTBx-VATS patients suffered post biopsy pneumothorax, one of whom was admitted. Adjusted mean direct dollar cost per case was 36,650\(\pm\)6,469 with SABRR and 31,220\(\pm\)10,877 with CTBx-VATS (p = 0.022).

Conclusion:
Single anesthetic robotic navigational bronchoscopy followed by robotic resection (SABRR) is a safe and effective alternative to the common staged approach. The moderate increased costs are justified by the reduced wait times to definitive resection, lower patient anxiety, and potential for earlier initiation of adjuvant therapy. As with any new technology, SABRR costs will be expected to decrease over time with streamlined protocols and increased experience.
Additional Resources

- https://files.aievolution.com/prd/aat2101/abstracts/abs_6289/CostAnalysisAbstractTable1.pdf